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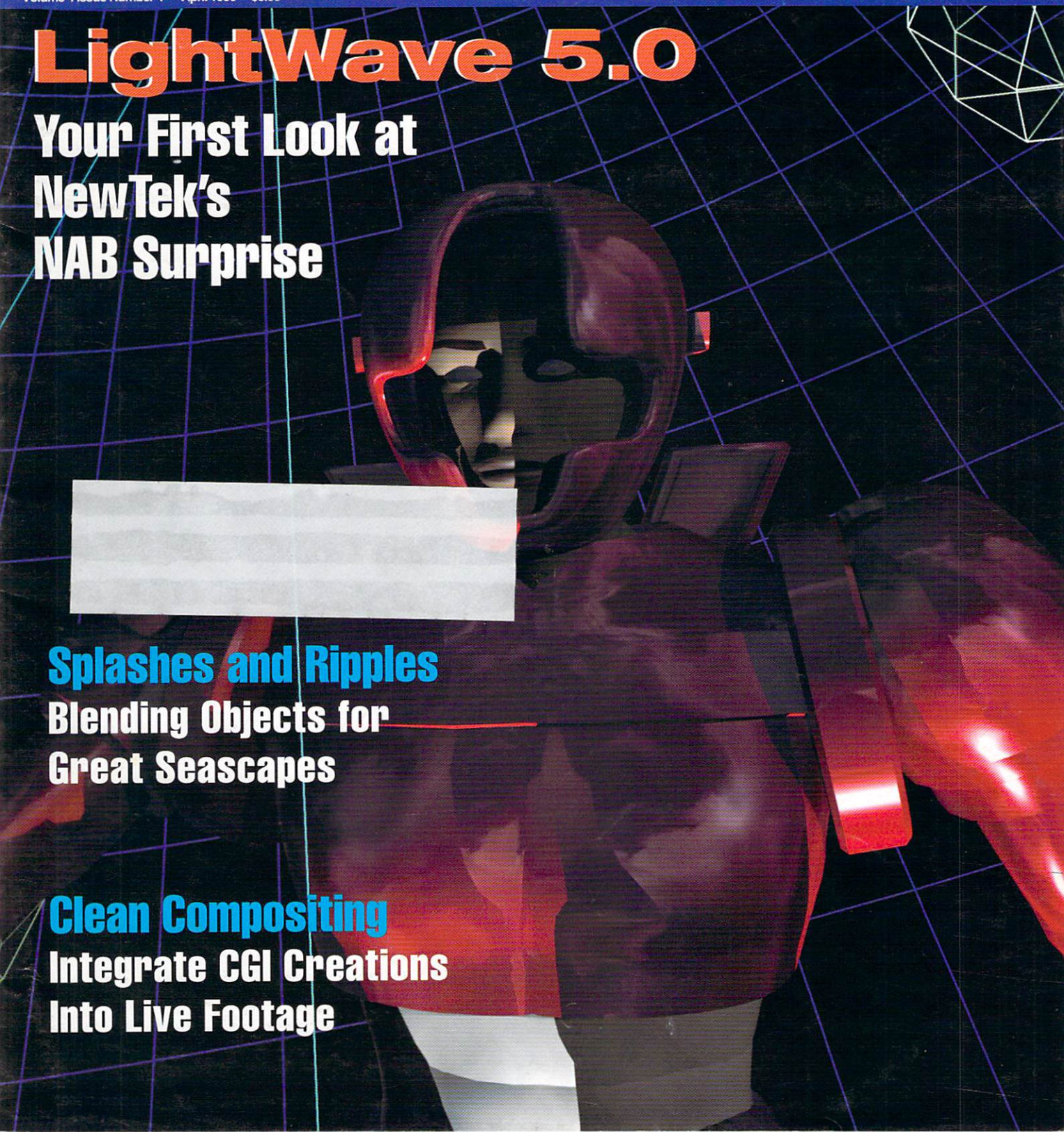


LightWave 5.0

Your First Look at NewTek's NAB Surprise

Splashes and Ripples

Blending Objects for Great Seascapes

Clean Compositing

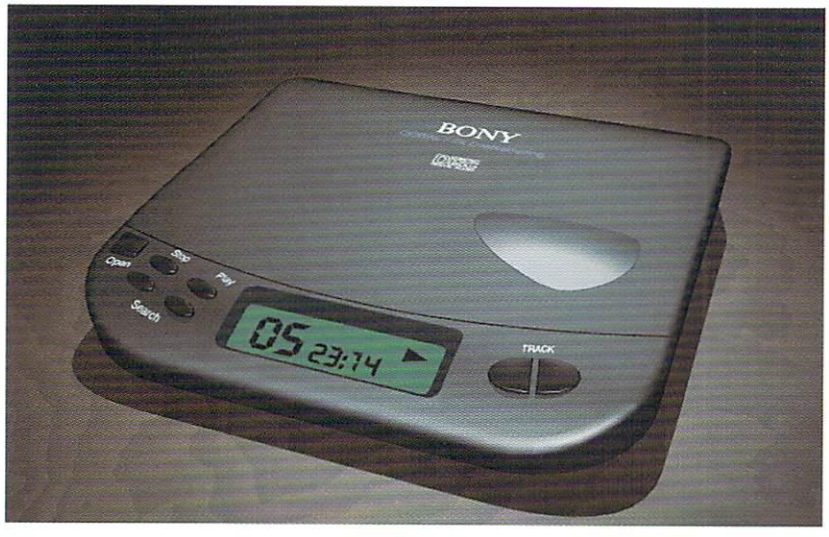
Integrate CGI Creations Into Live Footage

Shadow Alpha

This image (Figure 8) shows how the Shadow Alpha feature combined with proper lighting and reflections can seamlessly integrate 3D objects into 2D scenes.
Copyright©1996 Mark Thompson

Czar

This object uses a bump map to create the grooves in this highly detailed looking object.
Copyright©1996 Bruce Branit



CD Player

This object was built using MacroForm for the Amiga.
Copyright©1996 Douglas J. Nakakibara

EDITOR'S MESSAGE

by John Gross

I'm convinced that only about 10 people (including myself, Allen Hastings and a handful of people at NewTek) really understand the concept of LightWave's Content Directory feature. I've been thinking about this lately as we've recently rendered scenes for a couple of different effects houses that were sent to us. Upon loading the scene files we received the "Can't find object/image" messages that are typical when the content directory is not used properly. When I read the scene files in a text editor, I realized that people were just not using the content directory structure correctly. Even at Amblin Imaging, there were a number of animators that couldn't exactly grasp the concept, no matter how many times I tried explaining it. So, in the hopes of illuminating LightWave users on the benefits of using content directory properly, I will try to explain it here in plain English. For those of you that actually understand the concept, I apologize for perhaps wasting your time, but for those that don't, I think you will find this beneficial.

If you've ever read a scene file in LightWave and read a line such as, "LoadObject G:\NewTek\Objects\Logo.lwo," then you should be aware that you are not using the content directory properly. Under a proper content directory, this line should appear as: "LoadObject Objects\Logo.lwo".

The difference, obviously, is that the content directory-correct version has no reference to an actual drive. The path for the object and image files are always relative. In this case, the Content Directory button (Options panel) would be selected and set to G:\NewTek. When this is done, LightWave will automatically look for objects in the G:\NewTek\Objects directory and images in the G:\NewTek\Images directory. Likewise, scenes, surfaces, motions, etc., would be searched for in their respective directories, when you first select Load Scene, Load Surface, etc. When LightWave writes a scene file out, there will be no hard reference to paths that match the content directory path (The G:\NewTek in this case).

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"We provide the most valuable information to people who use technology to create messages with impact."

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This month's cover was created by John Parenteau and Mark Kochinski for a feature test. The scene depicts an "avatar" in a cyberspace game. An avatar is a computerized representation of a person chosen to represent him or her while they are involved in activities in the computer realm. In future issues, look for MetaNURBS tutorials and tricks for compositing and combining 3D elements into your 2D scenes.

MacroForm

Building a CD Player

by Douglas J. Nakakihara

MacroForm from One and Only Media allows you to use spline curves to form and mold objects using LightWave 3D Modeler. It also includes many other useful modeling tools. After playing around with Macroform for just a short while, I modeled a portable CD player—the very subject of this tutorial. The interesting parts of the CD Player you should note are the rounded edges, domed top, and beveled windows, all modeled using MacroForm. And even if you don't have MacroForm, you might pick up some useful tips from this tutorial. Note that this tutorial requires that you are running the Amiga version of LightWave Modeler.

Rounded Corner Box

Our starting point is a simple 2D rounded-corner box, with the front corners being more rounded than the rear. You could create it using parts of discs, but you can do it faster utilizing MacroForm's box-making macro with its built-in rounded corner option. (Default MacroForm function key assignments are shown in parenthesis.)

- Put Layer 1 in the foreground.
- Run the MacroForm NewBox macro (F6). Use settings: Rounded, Width=5, Height=0, Depth=5, Radius=.5, Segs=5, and Units=m. Segments Along should all be set to 1.
- Run NewBox (F6) again. Use the same settings, except set Radius=1 and Segs=10.

You should have two boxes with different sized rounded corners. (Figure 1) Use the points from the sharper corners for the rear (positive Z) and the points from the rounder corners for the front when creating a new polygon.

- Use the Remove (Polygon panel) command to remove the polygons (k). Only the points will remain.
- Make sure you are in the Point selection mode.
- Select and cut out (x) both 11-point arcs at the rear (positive Z).
- Select and cut out (x) both 6-point arcs at the front (negative Z).
- In the Top view, select all of the remaining points in clockwise order.
- Make the polygon (p). The polygon should look like Figure 2.
- Make sure the polygon is facing up. If not, flip it.
- Name this surface "Shell" (q).

Spline Curve Profile

Next, build the spline curve that will be used as the profile for the basic CD Player form.

- Put Layer 2 in the foreground and Layer 1 in the background.
- In the Face view, zoom in on the left side of the polygon (so the Grid is about 5cm).
- In the Face view, create 10 points as shown in Figure 3, from lowest to highest. The height of the curve is about 36cm. You don't have to be too exact, just create them at their approximate position. However, the first point should be at the left edge of the Layer 1 polygon, as seen in the Face view. (The circled points in Figure 3 are a notation for later on.)
- Select all of the points from lowest to highest.
- Create the curve (Control-p).
- Drag the points around to refine the curve's shape. Your result should look like Figure 4. You will have to drag two points on top of each other to smooth the curve (the two point pairs are circled in Figure 3).

Rail Routing

MacroForm's RailRout macro is really a sequential-beveling routine. The

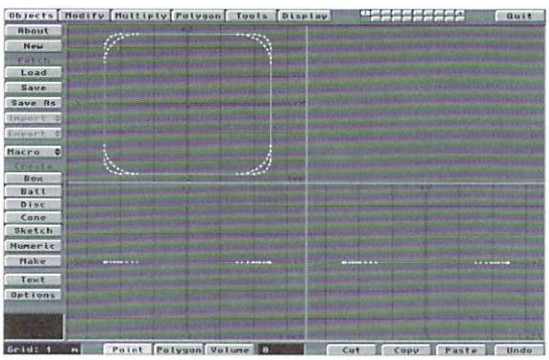

Figure 1: The two rounded-corner boxes.

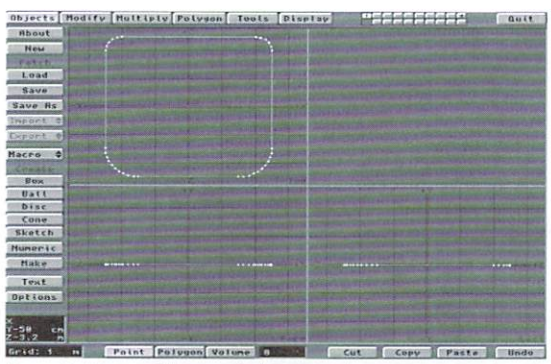

Figure 2: Picture of the rounded corner polygon.

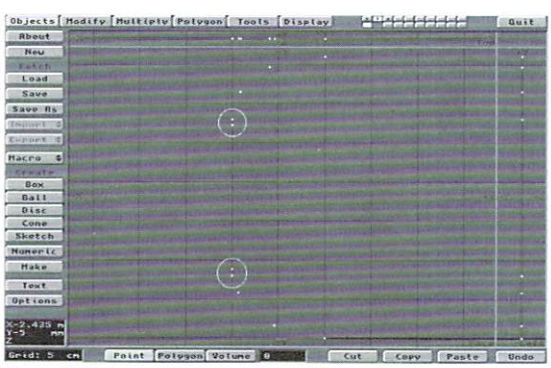

Figure 3: Points used to create basic form curve.

information for each bevel operation will be provided by the profile spline curve we made in Layer 2.

•Put Layer 1 in the foreground and Layer 2 in the background.
•Run MacroForm's RailToolz macro (F7). Use settings: Normal mode and Rout. The view and axis settings don't matter.
•Run RailRout. Use settings: Rout!, Segments=User, User<51=37, and the Close and Bit Size options should be off.

Yes, I Do Windows

You should now have a pretty nice looking box with rounded corners in Layer 1. Now you need to create window objects to be used as stencils. You'll use another rounded-corner box for the LCD window.

•Put Layer 3 in the foreground and Layer 1 in the background.
•Run the MacroForm NewBox macro (F6). Use settings: Rounded, Width=2, Height=0, Depth=.75, Radius=.1, Segs=5, and Units=m. Segments Along should all be set to 1.
•Position the created box in the Top view as in Figure 5. (The Y position doesn't matter)

Use a closed spline curve for the window.

•Make the points to form the closed curve, also shown in Figure 5. I used eight points.
•Select all of the points in clockwise order.
•Create the closed curve (Control-o).
•If needed, drag the points around to refine the curve's shape.

Stenciling

The two window objects in Layer 3 will now be stenciled into the CD player box's top polygon using Modeler's Drill tool.

•Put Layer 1 in the foreground and Layer 3 in the background.
•To save time, select only the large top rectangular polygon. It's OK if you get a few extra side polygons.
•Drill (Tools panel) the background objects into the CD player top. Select Y axis, Stencil, and enter "Window" as the surface name.

Window Depth

Now you are going to use MacroForm's RailRout tool again to give the windows some cool edges.

•Put Layer 1 in the foreground without a background layer.
•Select only the two Window polygons.
•Execute MacroForm's RailToolz macro (F7). Use settings: Normal mode and Rout. The view and axis settings don't matter.
•In the RailRout requester, load the "Buttons" router file. (It's in the MacroForm/Router directory.)
•Now run RailRout. Use settings: Rout!, Segments=File, and the Close and Bit Size options should be off.

The outside of both windows should now have a scored look. You'll have to zoom in real close to see it—if you don't believe me.

Uniform Subdivide

Before you attempt to shape the top of the box, you need to subdivide it. As it stands now, the large polygon on the top won't allow you to smoothly bend the object. Modeler's Subdivide function is just a little too random for use here. As luck would have it, MacroForm's Slice & Dice macro is just the trick.

•Deselect all polygons in Layer 1.
•Execute MacroForm's Slice & Dice macro (F5). Use settings: Bi-Directional, Top, Bi-Dir=35. (This operation takes a while. Don't worry, your machine didn't lock up.)

Molding the Top

OK, now you need to mold the upper portion of our box and give it a aerodynamic look. You need a spline curve and you could build one from scratch, but it's much easier to have MacroForm do it automatically. Then you can tweak the curve to your liking. Plus, you'll use MacroForm's "Apply" mode to make life even easier.

•Put Layer 1 in the foreground and Layer 4 in the background.
•Run MacroForm's RailToolz macro (F7) and open the Prefs requester.
•Set preferences to: Edit, Create=Form, Form=Dome, Set Knots=8 and Precision=Auto. Leave all other settings to their default values.
•Back in the RailToolz requester, select Apply mode, Mold, Left and Horizontal.
•Run RailMold. Use settings: Relative, Up/Right, Sense=+, Mirror=off and Type=Cent.

After the macro finishes executing (this operation can take a while), there should be a domed curve in Layer 4. The CD player in Layer 1 should be molded to the shape of the curve. Now modify the curve to the desired shape for the top of your CD player.

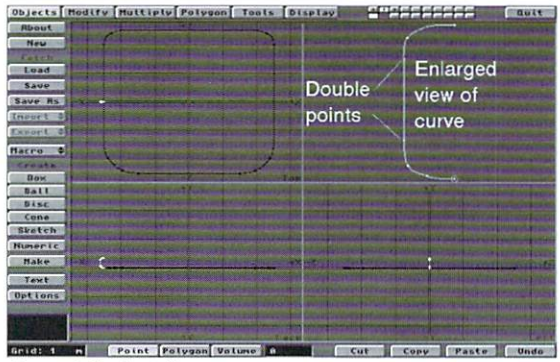

Figure 4: The basic form curve.

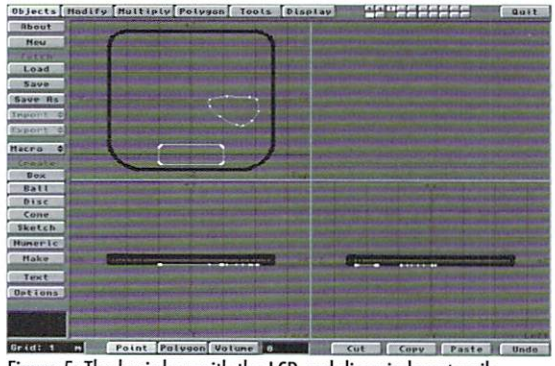
Figure 5: The basic box with the LCD and disc window stencils.

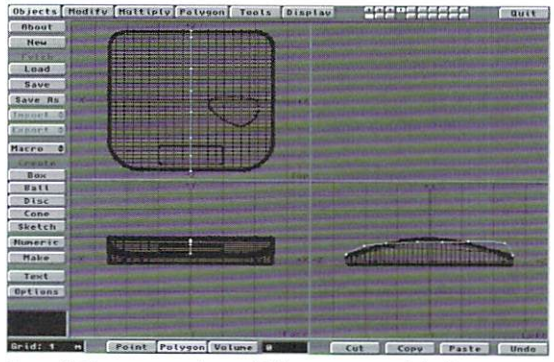
Figure 6: The curve used to mold the upper part of the box.

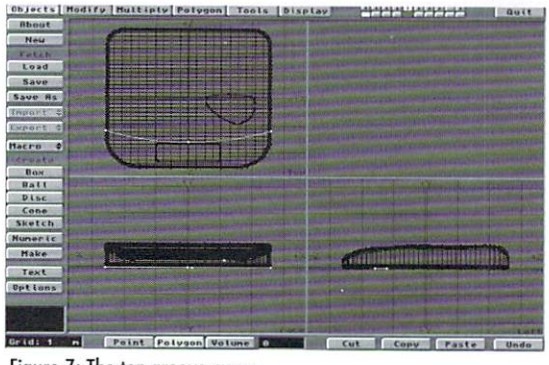
Figure 7: The top groove-curve.

•Layer 4 should be in the foreground and Layer 1 in the background.
•Drag the middle points into a shape like Figure 6.

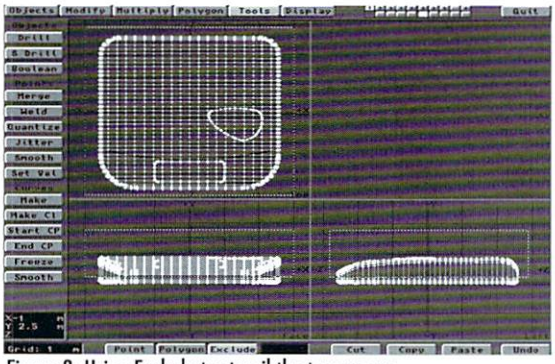

Figure 8: Using Exclude to stencil the top groove.

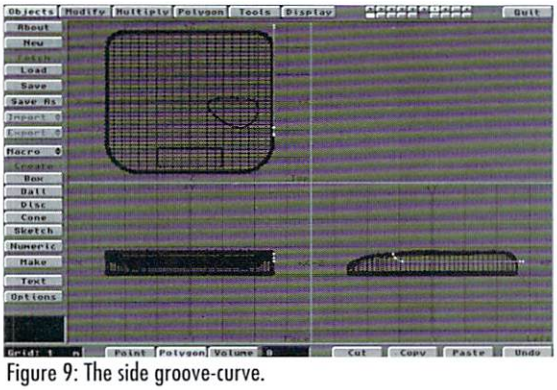

Figure 9: The side groove-curve.

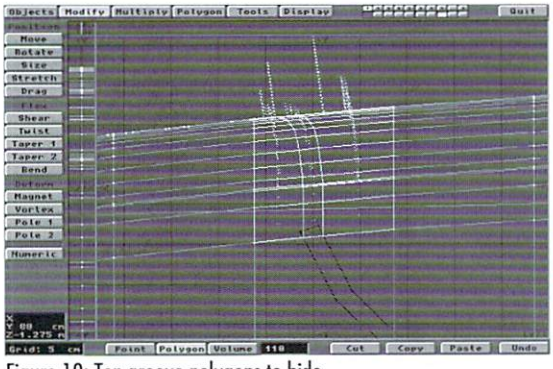

Figure 10: Top groove polygons to hide.

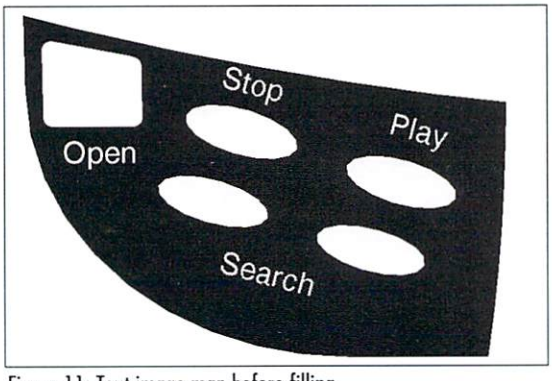

Figure 11: Text image map before filling.

Do not move the first and last points!

- Press F8 to re-apply the RailMold macro.
- If the CD player top isn't the right shape, simply adjust the curve and re-apply the operation (F8).

Get Into The Groove

Another feature of the CD player is the groove that gives the appearance of the lid being a separate piece. Basically, you need to stencil a thin stripe on the CD player and then indent it. This will require two curves. Let's create the top "groove-curve" first.

- Put Layer 5 in the foreground and Layer 1 in the background.
- From left to right in the Top view, make the points and form the curve (Control-p) in Figure 7. You only need three points. Make sure the end points line up exactly with the very edges of the CD player.

Now create a flat polygon that follows the curve with MacroForm's Offset macro.

- Put Layer 5 in the foreground without a background layer.
- Run MacroForm's RailToolz macro (F7). Use settings: Normal mode, Offset, Top and Horizontal.
- Run RailOffset. Use settings: Whole, Offset=2, Extend, User #, User #=20 and Units=cm.

Next, you need to stencil the top groove polygon in Layer 6 onto the box using Modeler's Drill tool.

- Put Layer 1 in the foreground and Layer 6 in the background.
- Use Modeler's Exclude feature so that only the top of the box will be affected. (See Figure 8.)
- Drill (Tools panel) the top curve into the box. Use settings: Y axis, Stencil, and enter "Groove" as the surface name.

Side In

Now create the side groove-curve.

- Put Layer 7 in the foreground and Layer 1 in the background.
- In the Left view, zoom in on the area where the stenciled top groove ends. Create your first point there.
- Make the remaining points and form the curve (Control-p) (Figure 9). You only need about five points total.

Let's create a flat polygon that follows this curve with MacroForm's Offset macro.

- Put Layer 7 in the foreground and have no background layer.
- Run MacroForm's RailToolz macro (F7). Use settings: Normal mode, Offset, Left and Horizontal.
- Run RailOffset. Use the same settings as above, except make the User #=50.

Before you stencil the side groove polygon in Layer 8, you'll probably need to slide it to line up with the stenciled top groove. You also need to make sure you don't get any of the side stencil onto polygons that already has the top groove. Here's how:

- Put Layer 8 in the foreground and Layer 1 in the background.
- In the Left view, zoom in real close to the area where the stenciled top groove touches the side groove curve.
- Move the side groove curve to line up with the very end of the stenciled top groove so it looks like one continuous groove. You may have to turn the Grid Snap option off (go to Options, then Display Panel).
- Change to the Polygon selection mode.
- Swap the foreground and background layers (').
- Carefully select the upper polygons that have the stenciled top groove. (Figure 10.)
- Now hide the selected polygons (-).
- Drill (Tools panel) the side curve into the box. Use settings: X axis, Stencil and "Groove" as the surface name.
- Unhide the hidden polygons (\).

Stencil Problem Fix

Sometimes you end up with some erroneous non-groove polygons ending up with the surface name Groove after the Drill operation. The easiest way to fix this is to first select all of the Groove surfaces and rename them something like Temp. Then, deselect the erroneous polygons. Next, rename the selected polygons Groove. Finally, select only the Temp polygons and rename them Shell.

Slight Shift

To indent the groove surface, use Modeler's Smooth Shift tool.

- Put Layer 1 in the foreground.
- Select the surfaces called "Groove".
- Smooth Shift (Sm. Shift button, Multiply panel) the groove. Use settings: Offset=-1 and Units=cm.
- Before you deselect any polygons, rename all currently selected polygons "Groove" (q).
- Now, cut them out (x) and paste (v) them back again.

Cut And Paste

Because of the CD player's curved top, you need to separate the Windows from the Shell. If you don't do this, you'll get weird rendering errors on and near the windows from LightWave's surface smoothing feature. (That's why we did it with the grooves.)

- Put Layer 1 in the foreground.
- Select only the Window surfaces. Use the Polygon Statistics requester (w).
- Cut them out (x) and paste (v) them into Layer 9.

This separates the outer border, but you must also separate the inner window surface.

- In the Top view, zoom in on one of the Windows.
- Carefully select the inner window polygons (everything except for the beveled edges).
- Cut them out (x).
- Study what is left and make sure you didn't miss any polygons or get any extra. If you did, immediately hit Undo (u) and start again.
- Now paste it back in (v).
- Do the same with the other window.
- Deselect all polygons.
- Cut (x) everything out of Layer 9 and paste (v) it back into Layer 1.

Buttons and Stuff

The buttons are simple extruded discs and a box. The tops are RailRouted using the "roundoff-10" router file to give them a domed shape. They are then positioned and rotated into place.

At this point you can check for non-planar polygons. In the Polygon selection mode, use the Polygon Statistics requester to select them (w) and then triple just those polygons. Whatever you do, do not merge points! This would destroy the Window and Groove separation and cause rendering errors.

The focus of this tutorial was the modeling of the CD player, but I should probably give you some idea of how I surfaced it and applied the text.

Text

I copied three sections from the top of the CD player where I wanted the text to be. Then I moved them about 1mm in the positive Y direction, so they barely floated above the CD player Shell. One section was for the "Bony" text in the center, one for the text on the left, and one for the text on the right. Each had a separate surface name.

Figure 12: Text image map after filling.

I rendered each section individually with the camera looking straight down on it so that it filled the frame as much as possible. I set Camera Zoom to about 6 to get a "flatter" picture. With the background and buttons set to pure white (255, 255, 255) I set the object surface to absolute black. All had 100-percent luminosity.

I loaded each rendered frame into ImageFX and added in the appropriate positions in the black area. I used ImageFX's automatic crop feature to cut off excess white areas surrounding the black area (Figure 11). Then I filled-in all non-text white areas with black (Figure 12). This way, you can use automatic sizing when surfacing.

I used these images as surface maps with the Additive (Surfaces panel) option turned on. Absolute black (0, 0, 0) becomes invisible. Then I added the text to the color of the CD Player (essentially black), so it became visible. (Some people might opt to use a transparency map, but this is more straightforward and I've found that under certain conditions you can still see "100-percent transparent" surfaces.)

Surfacing

The surface settings for the Windows were Color: 220, 220, 220, Luminosity: 0, Diffuse: 70, Specular: 73, Gloss: High, Transparency: 95, Refractive: 1, Smoothing: On. The surface settings for the Shell were Color: 25, 25, 25, Luminosity: 0, Diffuse: 86, Specular: 50, Gloss: Low, Transparency: 0, Smoothing: On. Use the Shell settings for the Groove surface, except use Gloss: Medium and Specular: 0. Also use the Shell settings for the Button surface, except use Gloss: Medium. I also added a LCD readout image mapped on a rectangular polygon beneath the LCD window for realism.

That's about it. MacroForm made it so easy, it took me longer to surface the CD player than model it. Currently, MacroForm is only available for Amiga LightWave, but PC and Amiga plug-in versions are due out soon.

Products Used:
MacroForm, $225
One and Only Media
P.O. Box 218
Vauxhall, NJ 07088
(908) 964-4546
http://chelsea.ios.com/~oaomedia
oaomedia@chelsea.ios.com

ImageFX, $349.95
Nova Design, Inc.
1910 Byrd Ave., Ste. 214
Richmond, VA 23060
(804) 282-5868

LWP

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This month's disk... includes scenes, images and object files from last month's "Let it Flow!" tutorial by Greg Wilson as well as Dan Bloomfield's 2D Trees tutorial. Also, the disk includes items from this month's "Splashes and Ripples" article by Gonzalo Garramuño, Douglas J. Nakakihara's CD Player and an example of Greg Wilson's "Paintless Worlds."

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Paintless Worlds

Build a Planet—All You Need is LightWave

by Greg Wilson

Though I've designed everything from spaceships to aliens to landscapes, one of my favorite objects to create is a planet that looks distinct and realistic. In all honesty, the shape of a planet is hardly that difficult to make, but surfacing the planet is a real challenge. Oftentimes, the greatest hurdle is finding a paint program to create the maps you'll need. For those people who can't afford the more elaborate paint programs, or who have no paint program at all, I've designed a technique for creating worlds in which you only need LightWave 3D, Modeler and Layout. In many instances, you will find that you have better control over your planet with this technique.

Let's Have a Ball

Unless you're creating a fantasy world, we'll be making up our world with several layers of spheres. The first layer will be the water, second is the land, third will be the polar caps, fourth is the clouds, while fifth is the atmosphere. Nothing too difficult, so let's get started.

•Select Ball (Objects panel), click the Numeric button (n) and enter these values:

Sides=64
Segments=32
Radii
X=20m
Y=20m
Z=20m

•Select Surface (Polygon panel) and name it "Water".
•Select Save As (Objects panel or S) and save this sphere as "Water.lwo".
•Go to layer 2
•Select Ball (Objects panel), click the Numeric button (n) and enter these values:

Sides=64
Segments=32
Radii
X=20.001m
Y=20.001m
Z=20.001m

•Select Surface (Polygon panel) and name it "Land".
•Select Save As (Objects panel or S) and save this sphere as "Land.lwo".
•Go to layer 3
•Select Ball (Objects panel),click the Numeric button (n) and enter these values:

Sides=64
Segments=32
Radii
X=20.002m
Y=20.002m
Z=20.002m

•Highlight the middle 24 rows of polygons and press Delete so that you have a top and bottom cap as shown in Figure 1.
•Select all the polygons on the bottom cap and click the Cut button (X).
•Go to layer 4 and click Paste (V).
•Select Surface (Polygon panel) and name this surface "South Pole".
•Select Save As (Objects panel or S) and save this object as "South.lwo"
•Go back to layer 3.
•Select Surface (Polygon panel) and give it the name "North Pole".
•Click Save As (Objects panel or S) and save as "North.lwo".
•Go to layer 5.
•Select Ball (Objects panel), click the Numeric button (n) and enter these values:

Sides=64
Segments=32
Radii
X=20.1m
Y=20.1m
Z=20.1m

•Select Surface (Polygon panel) and name it "Clouds".
•Select Save As (Objects panel or S) and save this sphere as "Clouds.lwo".
•Go to layer 6.
•Select Ball (Objects panel), click the Numeric button (n) and enter these values:

Sides=64
Segments=32
Radii
X=20.5m
Y=20.5m
Z=20.5m

•Select Surface (Polygon panel) and name it "Atmosphere".
•Select Save As (Objects panel or S) and save this sphere as "Atmsphr.lwo".

Fractals To The Rescue

Now that you've made all of your objects, go into Layout and load each of them. In Layout you'll be using fractals for all of your surfacing, from clip maps to surface textures. Your goal here will be to create what looks like an inhabitable planet, so nothing but fractals is really needed. However, for more devastated or exotic planets, have fun experimenting with other procedural maps. Before we get started, I should make it clear that when entering surface values, I will not list those that are unchanged from the default values.

While we're in the objects panel, perform the following steps:

•Select Land as our Current Object (Objects panel) and click Clip Map.
•Select Fractal Noise as our Texture Type (Objects panel), then enter the following values:

Texture Size
X=10
Y=10
Z=10
Texture Value=400%

Frequencies=6
Contrast=10

You've just used the clip map to cut out certain areas of our land so that the ocean underneath can be seen. Now you need to use clip maps on our polar caps so the land or water below can also be seen.

•Select North as our Current Object (Objects panel) and click Clip Map.
•Select Fractal Noise as our Texture Type (Objects panel), then enter these values:

Texture Center
X=0
Y=18.5
Z=0
Texture Falloff
X=0
Y=80
Z=0
Texture Value=400%
Frequencies=10

That completes the north pole, so switch your Current Object (Objects panel) to South and enter the same values, except make the Texture Center -18.5 instead. Now finish by doing the following few steps:

•Select Clouds as the Current Object (Objects panel) and turn off Cast Shadow.
•Select Atmsphr as the Current Object (Objects panel) and set Object Dissolve to 50%.
•Leave the Objects panel and parent all of the objects to the Water object.

The Water

•Go into the Surfaces panel.
•Select Water as the Current Surface (Surfaces panel) and enter the following:

Surface Color
Red=34
Green=67
Blue=84
Diffuse Level=95%

•Click Sharp Terminator (Surfaces panel).
•Turn on Smoothing (Surfaces panel).
•Click the T (Texture Map) button beside Specular Level and put Fractal Noise as our Texture Type, then enter the following:

Texture Size
X=0.005
Y=0.005
Z=0.005
Texture Value=35%

•Back in the Surfaces panel, use High as your glossiness.

The Land

•Select Land as our Current Surface (Surfaces panel) and enter these values:

Surface Color
Red=105
Green=89
Blue=31
Specular Level=10%
Glossiness=Low

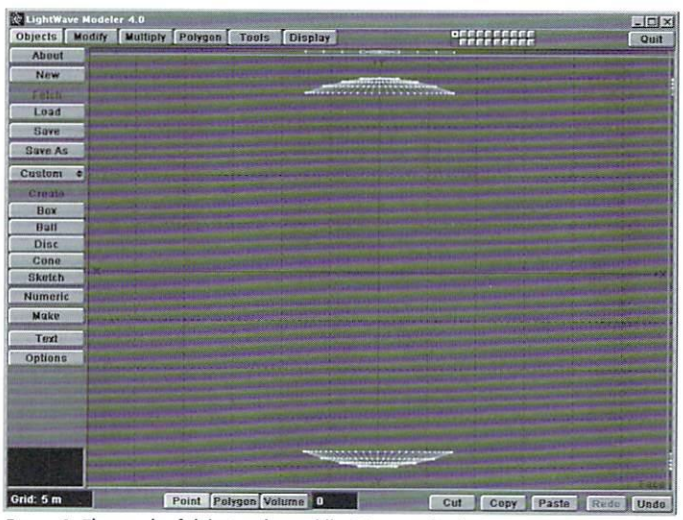

Figure 1: The result of deleting the middle 18 rows of polygons.

•Turn on Sharp Terminator (Surfaces panel).
•Turn Smoothing on (Surfaces panel).
•Click the T (Texture Map) button beside Surface Color and select Fractal Noise as our Texture Type.
•Enter these values:

Texture Size
X=3
Y=3
Z=3
Texture Color
Red=75
Green=83
Blue=53
Frequencies=4
Contrast=4

•Click the T (Texture Map) button beside Diffuse Level and select Fractal Noise as the Texture Type.
•Enter the following:

Texture Size
X=0.8
Y=0.8
Z=0.8
Texture Value=40%
Frequencies=2
Contrast=0.5

The North And South Poles

•Select North as the Current Surface (Surfaces panel) and enter these values:

Surface Color
Red=225
Green=232
Blue=255
Diffuse Level=90%
Specular Level=38%

•Click Sharp Terminator (Surfaces panel).
•Turn on Smoothing (Surfaces panel).
•Click the T (Texture Map) button beside Surface Color, select Fractal Noise as the Current Surface and enter the following:

Texture Size
X=0.7
Y=0.7
Z=0.7
Texture Color
Red=225
Green=225
Blue=225
Contrast=0.5

•Click the T (Texture Map) button beside Diffuse Level, make Fractal Noise your Texture Type, then enter the following:

Texture Size
X=0.4
Y=0.4
Z=0.4
Texture Value=80%
Frequencies=6
Contrast=0.7

This finishes your North surface, so repeat these values for the South surface.

The Clouds

•Select Clouds as the Current Surface (Surfaces panel) and enter the following values:

Surface Color
Red=225
Green=225
Blue=225

see Paintless Worlds, page 16

Clean Composites

Bath Time With Shadow Alpha

by Mark Thompson

You could argue that learning how to seamlessly integrate a CGI element into existing footage is one of the single most important talents an animator could learn when working in the commercial/entertainment animation industry. Accomplishing such a feat crosses many areas of expertise. Detailed object modeling, realistic surfacing, perfectly matched lighting, proper camera motion and settings, and image processing to duplicate the look of the background plate are all factors in achieving a seamless composite. The tools within LightWave 3D for doing this type of work have been more than adequate. The various television shows that have utilized LightWave for special effects are a testament to this capability. Robocop, Babylon 5, SeaQuest, Hercules, Star Trek: Voyager and many others are all prime examples. Now with the release of version 4 and version 5, LightWave has been further enhanced in this area. Shadow Alpha, a new attribute in the Surfaces panel, greatly simplifies some of the mundane tasks.

Keeping it Simple

Before Shadow Alpha was introduced, LightWave was no less capable at compositing tasks, but it could be more difficult to use at times. If you have seen the first tape in my *in.focus* tutorial series, I covered in detail the steps required to achieve a seamless CGI composite to live footage with a moving camera. The scene in the video had two light sources and one surface on which to cast composite shadows. The trick is to light the surface so that it perfectly blends with the background plate while still having proper shadow lighting. Many people have done this through trial and error, but it can be rather laborious. In the video, I presented a method to actually calculate the light intensity values without all the guess work. However, the new Shadow Alpha feature eliminates the need for light calculations or trial and error. To understand how this is achieved, let me describe exactly what Shadow Alpha does.

When it comes down to it, the name Shadow Alpha pretty much describes exactly what the feature does, it casts a shadow into the alpha channel. When a surface has Shadow Alpha enabled, the surface becomes invisible in the alpha channel. However, any shadow cast on that surface is translated into the alpha channel. The darker the shadow cast, the whiter the shadow image projected into alpha image output. The idea behind this feature is to use it on the stand-in objects that will serve only to add shadows from the foreground CGI element to the background image plate. The best way to truly illustrate how this feature works is to use a real world example. One fellow animator on the LightWave mailing list suggested I use the scene in the *in.focus* video to illustrate how it would be done with Shadow Alpha.

In this scene, a camera panned across a pool table immediately following the opening break. I used LightWave to seamlessly composite in an additional ball while the camera tracked the live action. Using Shadow Alpha on this scene was not necessary, nor would it have been more efficient. So I have decided to present a situation where compositing without Shadow Alpha would be much more difficult.

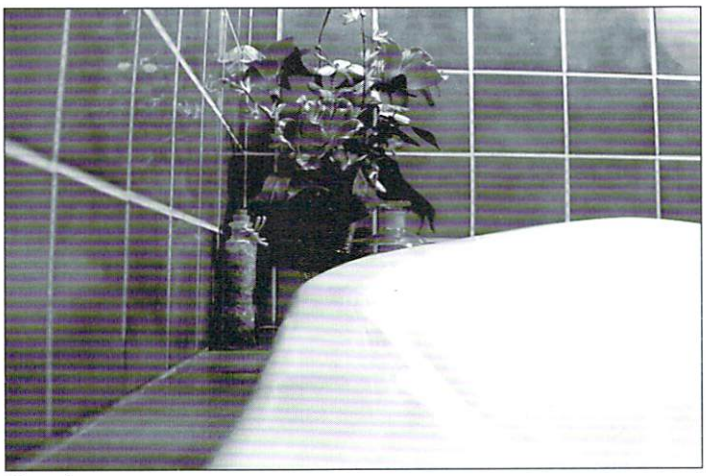

Figure 1

Compositing Magic

The setting is my bathroom, in and around my tub. In Modeler I have created a spray cleanser bottle that will, through the magic of compositing, interact with this real environment. After deciding where the LightWave object will be in the picture, the first task is to make a crude model of the environment that it will interact with. In this case, there is the rim of the tub, the gutter next to it, and then the bathroom wall, as can be seen in Figure 1. The best way to build the "stand-in" environment object is to first take some measurements of the actual environment. Then put the captured image in the background of Modeler and use it as a guide for creating a profile. This profile can then be extruded and properly sized to match the measurements taken. However, this scene presents some minor difficulty because the tub rim slopes up along its

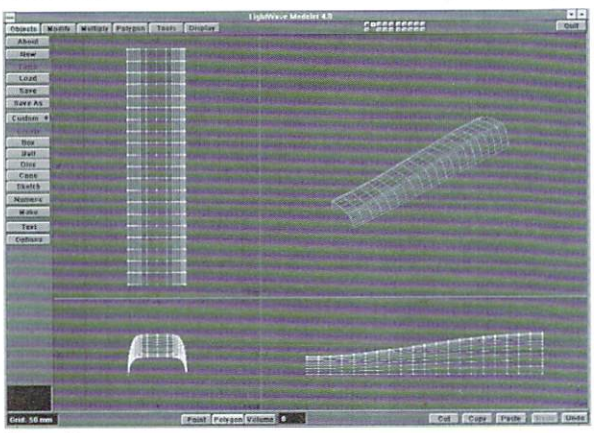

Figure 2

length. To deal with this, you could either use a multi-segment extrude and then taper it, or create an extrusion curve and use rail extrude. I chose to use Taper 2 with Ease-in and Ease-out enabled. The result is in Figure 2. In the final model, the wall and gutter are added, and the tub rim is extended in either direction so it will have enough length (Figure 3). To complete the model, the surface names Wall, Gutter, and Tub are assigned to their respective polygons.

Before loading the stand-in object into LightWave, it is critical that the camera be properly set up in the scene to match the camera used to capture the background plate. Measuring off the camera position in the real world during the shoot can be extremely helpful in doing this. If you don't know its real world position, you will have to eyeball it. It is an iterative task of setting a position, rotation, and zoom factor so that the perspective of the LightWave camera matches the real world camera. With the captured image loaded into the background, choose a set of parallel reference lines to define the perspective view. In this case, the tiles, the base of the wall, and the edges of the tub rim are all helpful guides. Use the visible grid in LightWave to align the virtual camera view with that of the real one. Once you are fairly satisfied, load the stand-in object and place it so that its contours also match the background plate. You may have to make additional camera adjustments at this point, but they should be minimal. The final aligned shot is in Figure 4. Note that proper camera setup is more lax in a situation where the camera remains stationary in the scene, as is the case here.

Enter Shadow Alpha

Now that we are at the surfacing and lighting stage, Shadow Alpha finally comes into play. The stand-in object will be textured using front projection mapping, allowing it to match the background plate exactly. However, the key to making front projection mapping succeed is to assure 100% illumination across all surfaces of the stand-in object, so the intensity of the mapped image precisely matches the background plate. The wall and the gutter present no problem because they are flat planar surfaces which can easily be lit uniformly. But the tub rim is a curved surface, and any attempt to duplicate the lighting used in the actual shoot will yield non-uniform illumination.

The result is a visible boundary between the stand-in object and the background as seen in Figure 5. Shadow Alpha eliminates this problem because it eliminates the need to illuminate the stand-in surface. There is no need to balance light intensities, note light angles, or figure out surface diffuse and luminous settings. Instead, just set up your lights as they should be to duplicate those used in the background plate, and set luminous, specular, and diffuse settings on the stand-in surface to 0%.

The stand-in surface will render completely black. However, with Shadow Alpha enabled, the alpha channel will ignore the presence of that surface with the exception of where shadows are cast on it. Essentially, the surfaces have become completely invisible, but still receive and display shadows. You just don't see the shadows because they only exist in the alpha channel. Let's get back to our example. To surface the stand-in object, use the following attributes for all three surfaces:

Color 0, 0, 0
Luminous 0%
Diffuse 0.1%
Specular 0%
Shadow Alpha enabled

Note that diffuse is not set to zero, but something very close to it. LightWave will not cast shadows on a surface with 0% Diffuse, so some value is needed. It really does not matter because with color and specular set to zero, nothing will show up anyway. Now to make things a little more interesting and add a nice touch of realism, give the surfaces a small amount of reflectivity. I used 7%, 3%, and 9% for the tub, gutter, and wall respectively. In the Reflection Options, select Ray Tracing + Backdrop, and enable Trace Reflection in the Camera panel.

To set up lighting, consider the placement that was used when shooting the scene. Also, carefully study the background image noting specular highlights and the direction and darkness of the cast shadows. These will all give you very good clues on light placement and intensity. For now, rough approximations are fine. You are now ready to place the spray bottle into the scene.

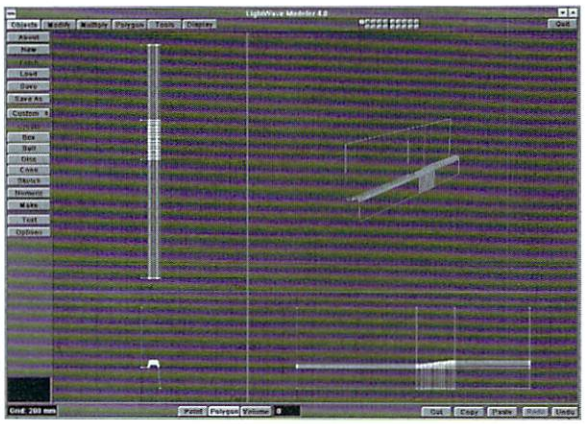

Figure 3

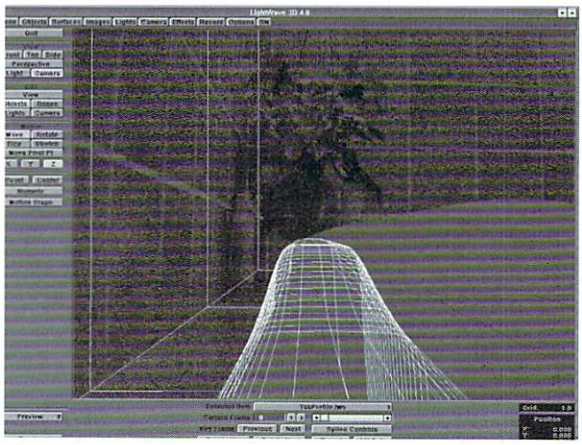

Figure 4

Figure 5

In my example, I placed bones up the center of the bottle and animated it jumping toward the camera down the length of the gutter. You will likely want to set up your animation before fine tuning the lights because then you will know the positional extents of your object within the view of the lights. With the spray bottle's motion complete, render a test frame to see if its lighting adequately matches the background. If it doesn't, adjust the lights accordingly. Its a good idea to use spot lights with shadow maps for your shadow casting sources. This allows nice soft shadows that will look much more natural. I used two shadow casting sources, each sized 1000 with fuzziness set to 10.

Using Shadow Alpha makes LightWave compositing a two pass process. In order to see the final composite, render out and save both the RGB and alpha channels to files. Figures 6 and 7 are the RGB and alpha images respectively. In Figure 6, you can see

see Shadow Alpha, page 17

Splashes and Ripples

Blending Objects to Bring Your Sea to Life

by Gonzalo Garramuño

If you've been using LightWave 3D for a while, you probably have played around with the Ripples bump map texture. After figuring out how to use it (see sidebar), you will soon find out that it has a small problem: you can't actually control the position/center of the circular ripples—unless you use only one. So, when your client suggested creating a dolphin jumping around the ocean, you just knew you were in trouble. Or maybe not.

Examine the Possibilities

Before you start working, try to figure out exactly what you need. If, for example, your dolphin stayed in the air long enough, you might be able to fake it by using several sea objects, each one with the ripple bump map texture as a displacement map in a different position.

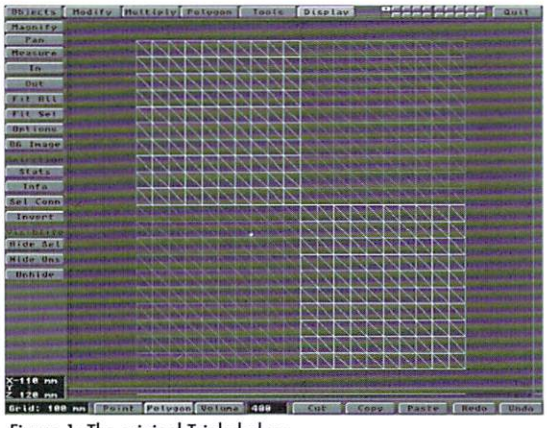

Figure 1: The original Tripled plane.

In the July 1994 issue of *LIGHTWAVEPRO*, Mark Thompson showed us how to use a sequence of images as displacement or bump maps to create rain puddles. However, creating images to be used as displacement maps for ripples is not an easy task, especially when you need to accurately place the center of your ripple. Therefore, you might consider another way of faking it: use several objects, each with a one ripple displacement map, then blend them seamlessly with the rest of your sea.

Getting Down to Business

Go into Modeler and create a grid to represent one ripple. Select Box (Objects). Size the box on the top view to your liking and press "n" (numeric input). Use as many segments as you want. In my case, I used:

Low	X = -500 mm
High	X = 500 m
Segments	= 20
Low	Y = 0
High	Y = 0
Segments	= 1
Low	Z = -500 mm
High	Z = 500 mm
Segments	= 20

Triple (Polygon) this object to avoid deformation problems later when using a displacement map on it. Check that normals are facing upwards. If not, use Flip (Polygon). Notice that Triple will create all triangles facing in the same direction (Figure 1).

The following step is not extremely important, but it can be visually helpful later when modifying the ripples manually and you will be able to trace the shape of the ripple easily in wireframe. Delete the two quadrants that have triangles facing in the wrong direction (using volumetric selection) and then Mirror (Multiply) the remaining two on X again. This will create a plane with triangles forming several rhomboid shapes around its center (Figure 2).

Use Points Merge (Tools) in Automatic to merge any repeated points. Save the plane under a new name (norip.lwo). Now, use this basic plane to create your sea. You could also create a new box with new parameters, but using Array will make things work faster later .

Press Array (Multiply) and use a Rectangular array of any dimensions you want in X and Z, but make Y only 1. Remember that LightWave has a limit of only 65,536 points per object, so make sure never to go over that number. If you think your sea will need more detail than what LightWave limits you to, you can use several copies of this object in Layout later.

Center the object, use Points Merge (Tools) to erase duplicated points and save this object (sea.lwo). Now go into Layout, bring this object in and keyframe the motion of your dolphin. Write down the absolute coordinates of where the dolphin hits the water. If your dolphin's pivot point is offset, use Add Null Object (Objects) and move it around in each keyframe where the dolphin touches the water. Then check its position in the information box. After you are finished with the null, erase it with Clear Object (Objects). You will use this information in Modeler.

Next, you need to create holes in your sea object for your ripples objects to appear, so load both the sea object and your ripple object. Now, move your ripple object to the different coordinates from Layout, and then use Template Drill on Y to drill the holes into your sea object. Since your sea object is quite big, you can go into Options

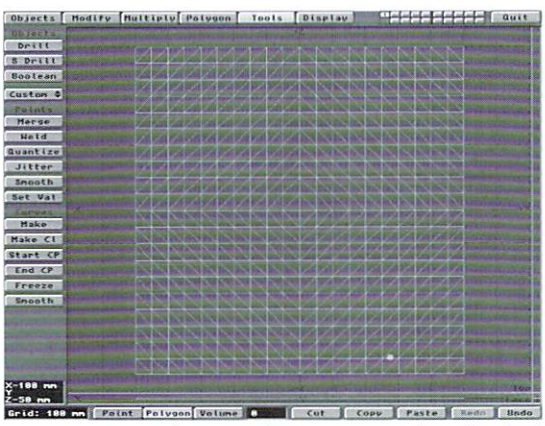

Figure 2: Mirroring the two quadrants gives you a basic rhomboid outline.

(Display) and make sure you are only displaying Points to make your display faster. To make Template Drill work faster, use Volume Select to mark the polys that will be modified. If point vertices overlap, Template Drill will not work, but you can then just use Volume Select and press "z" (delete). If you created your sea object from your original ripple object (norip.lwo), you can work faster by just deleting the polygons.

After you have created all the holes where your splashes will be, save the object again (seahole.lwo) Go into Layout and bring in your dolphin scene. Hide All Objects (Scene) except your dolphin and load the norip.lwo object. Now add the Ripples texture to the splash object as a Displacement Map (Objects). Experiment a little with the parameters until you get a satisfying result (keep the dolphin visible so you can measure the ripples to it). I only changed these parameters:

- Texture Center: 0, 1, 0
- Texture Falloff: 200%, 0, 200% (This makes sure the texture fades before reaching the edges of our splash object. 100% = 1 m, 200% =500 mm)
- Texture Amplitude: Envelope
- Frame 0 : 0.25
- Frame 40: 0 (If you want the ripples to stay longer, use a bigger frame number.)
- Wave Sources: 1
- Wave Length: 0.05
- Wave Speed: 0.0025

Make sure your scene is at least the length of your texture amplitude envelope (40 frames). Move the perspective view so you see the splash correctly and make a preview. It seems we are on the right track, but there are a couple of problems. Notice that the fall-off has created a very noticeable rhomboid shape within the splash object. Another problem is that you can't control the exact moment when the up or down movement should occur. Another problem you are going to run into is that the ripples will look very much alike. What can you do?

Modeling Your Own Ripples

The solution to this problem is to use what we already have; apply more transformations in Modeler and save several versions of the rippling plane. What we need to do is to travel our animation (every 4 frames, for example) and use Save Transformed (Objects), giving a different name or numeration to each version (ripple1.lwo, ripple2.lwo, etc.). It's a tedious job, but it will allow you later to morph from one version to the other, achieving the same effect we were getting with the ripple texture.

Now, go back into Modeler and load those ripples again. Because you have ten layers, you can work on that many key positions at a time. In Modeler, you can use a combination of tools to achieve further deformations: Move, Drag, Magnet, Bend, Vortex, etc. I would start by dragging those points that make the rhomboid shape to make them look more circular. You can also use a combination of a radial Jitter (Tools) with Points Smooth (Tools) to make it more circular by using a volume box that doesn't include the edges of the ripple plane.

On the first big splash, use vortex to add a small twist to it. The other tools can be used to make the ripples less regular, just remember that you should not modify the structure of the ripple objects. Don't use cut, copy or paste or try to add or erase any points; it could cause problems with the morphing later on.

At this stage, good animators will turn to some sort of stock footage to take a look at how real ripples and splashes look. Don't worry about buying stock footage, some relative will undoubtedly have a home movie of people diving and swimming in a pool.

Because you're going to be morphing the shape and not the surfaces of the waves, you actually don't need any polygons in these new ripples. If you have too many keyshapes, you can run into memory problems. By deleting the polygons here in modeler (press "k" for Remove Polys), you can save some precious memory. But remember, if you need to modify the shape again, you won't be able to see it in the solid view.

Save each key shape again from Modeler under a new name in case you made a mistake. If you plan on having many ripples, you may want to repeat the process several times with different values and different deformations to avoid matching ripples. Why didn't we create the ripples from scratch in Modeler? Because it would have proved too difficult and we wouldn't have been able to make a good animation.

One Ripple

Starting from scratch in Layout, load each and every morph position, including norip.lwo. Now, set up the morphs and morphing envelopes for each object. I'll use LightWave 4.0's new hidden feature: multiple morphing envelopes. It makes things much easier for this type of job .

Make a clone of norip.lwo with Clone Object (Objects panel). Now, change the name of Metamorph Target for each of the objects. In our example, norip.lwo (1) has ripple1.lwo as its target, ripple1.lwo gets ripple2.lwo, etc. Finally, make the clone of norip.lwo the target for your last shape. All of your objects except norip.lwo (1) should be 100% Dissolved. If you are very low on memory, bring norip.lwo into Modeler, removing the polygons and saving it under another name instead of cloning it.

You may consider adding particles or other small waterdrop objects to enhance the effect of the splashes. If you have Sparks or Particle Storm, you can accurately simulate the movement of the particles. If not, you can probably achieve a good effect just by sizing a group of particles (created with the Random Points macro/plug-in). Make sure you parent all objects to norip.lwo. This will allow you to easily move your splash to anywhere you want.

Now, turn on LightWave's hidden features. With no panels open, press SHIFT+CTRL+F1. Find the object panel and go to your first object, norip.lwo (1). Press SHIFT+CTRL+F2, to turn multiple targets on and edit this object's Metamorph Envelope (Objects panel). Remember, every 100%, has been morphed into another object. For example, 100% will morph to ripple1.lwo, 200% will morph to ripple2.lwo, etc. This is where you can change the timing of your ripples. Finally, the last morph will bring your object back to a plane. Note that you actually had to morph to a new clone of the object and you didn't bring the envelope back to 0. If you had done that, the object would have stepped through all previous morphs.

This is the only small drawback of LightWave's multiple targets. Do a preview to check that everything is OK and save this scene (ripple1.lws). If you have many different ripples, do the same for all the others. Consider using Replace Object (Objects panel) to change keyshapes without changing envelopes.

Bringing the Ripples Together

You are now ready to load or create the final scene. Use Load from Scene to load the different ripple scenes into your sea. Now, just place your ripples on the empty spots in the sea. To enhance the effect and to make your sea more real, add a new displacement map to all your objects (sea and ripples). For these displacement maps, turn on World Coordinates, allowing the displacement maps to blend seamlessly from one object to the other (make sure to use the same values for all of them). Note that for the displacement map to blend objects correctly, you need to have the same number of vertices in the empty hole spaces as in the edges of your morphing ripples (that's why we used Array in Modeler). An important feature that you should consider is, a displacement map is not changed by the size of the object when using World coordinates. Use this to your advantage to size your ripple objects in Y, which will make ripples higher or lower without affecting the world displaced ripples.

If you apply a texture to your sea and ripples, also consider using World Coordinates for them, too. This will allow you to rotate your ripples 90 degrees, without the texture moving in the wrong direction.

Overlapping Ripples

In this tutorial you will notice that because our different ripples are actually in different objects,

see Splashes and Ripples, page 18

LightWave 5.0

A Look at NewTek's NAB Surprise

by John Gross

NewTek surprised just about everyone at NAB this year by making LightWave 3D 5.0 available for order. After the long delay in the release of 4.0, it seems like 5.0 came out right on its heels. This version of LightWave—code named Tombstone during its development phase—was kept extremely quiet by the alpha/beta testers and just kind of showed up at NAB. Once again, our favorite 3D program has undergone some significant changes and exciting new feature development. In this article we'll take a look at some of the most significant changes.

Of course, the big news is that the new Windows versions of LightWave and Modeler support OpenGL (as will the SGI version when it ships). Using OpenGL, you are able to preview your objects and background images (Layout only) in full color. I can't tell you how amazing it was the first time I was able to load an object, toggle on OpenGL and view it in full color in both Modeler and LightWave. It felt sort of like my 3D program was growing up. It's an amazing thing to be able to move lights around in Layout and watch how they affect your objects. Since OpenGL is a part of the NT operating system, you can use it without having to buy an OpenGL accelerator card, however, you will be accessing it through software and your displays may be a bit slow for large objects. By purchasing an OpenGL card, you can dramatically speed this up.

The Import/Export function has been re-introduced into Layout and Modeler. This feature, native to the Amiga but missing from 4.0 Windows versions, allows you to pull objects into Modeler from layout and back again after making changes. I became used to not having it when I switched my platform to Windows, but realize how useful it is now that I have it back.

Modeler

Let's take a look at some of the program-specific features of Layout and Modeler. The biggest news in Modeler is a function called MetaNURBS. Like Metaform before it, MetaNURBS advances yet simplifies the creation of smoothly curved shapes. I like to think of modeling with MetaNURBS as a semi-real-time Metaform session. By simply pressing the Tab key, Modeler will toggle between showing you normal polygon faces and MetaNURB patches. Think of a patch object as a final Metaformed object using the number of patch divisions specified in the Options panel (Objects). The original faces of your object become dotted lines connected at the points which are now used as control vertices for defining the shape of the object (Figure 3).

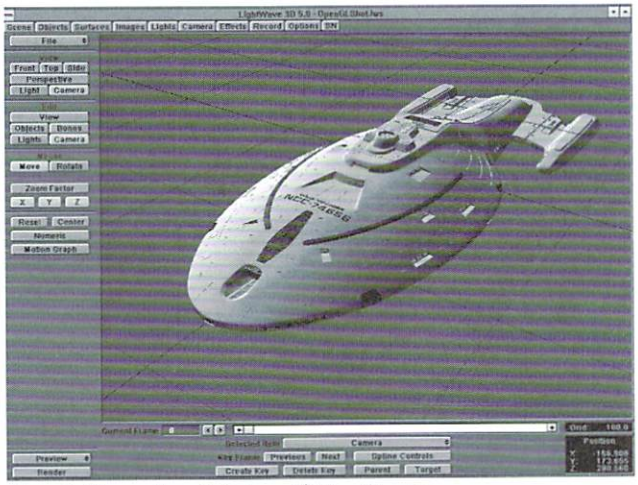

Figure 1: The new layout window with OpenGL active.

Figure 2: OpenGL support in Modeler allows you to see shaded previews of objects.

This "control cage" surrounds your patch object and by dragging the points around, you can control the shape of the internal patch object. It sounds a bit more complicated than it really is, and you won't believe how cool it is to work with. By subdividing the object in it's patch state, you create more control points that allow you to modify it even more. Using MetaNURBS is kind of like modeling with clay. You start with a brick of clay and by pushing and pulling in different areas, you can create some truly remarkable objects. When I think back to when Tony Stutterheim and I modeled the seaQuest ship using splines and how difficult and time consuming it was, and how easy it would be using MetaNURBS, it makes me want to attempt modeling it again. Well, maybe not. Remember, to make sure that you are using either the OpenGL flat or smooth shaded preview type to see your control vertices in your preview display.

I think MetaNURBS, like Metaform, is another leap forward in polygonal modeling, and the more you use it, the less you will ever want to go back to older ways of modeling.

With the added OpenGL support in Modeler, it became apparent that there was a need to allow some surface changes from within Modeler so the Change Surface panel (q) has become much bigger. You can now change the color of sur-

faces as well as change basic surface functions such as Specular, Diffuse, Glossiness, Double Sided and Smoothing. Of course all of the changes are updated and you can display them in the new OpenGL flat or smooth shaded preview types.

Speaking of the new display types, Modeler now allows for a wide variety of saved view parameters by pressing the Control key and a number on the numeric keypad. You have the option of saving the center, zoom factor, FG/BG layers, visibility, orientation, quad shape and the preview type. I don't think many people are using these functions to their full extent yet (a limited subset of these were able to be saved with 4.0), but I highly recommend you start assigning at least the preview types to some keys. It's now a simple matter to toggle between OpenGL flat or smooth shaded or no preview at all, plus all of the other savable parameters. Whatever you set up is called again by simply pressing the number on the keypad, and they are saved in Modeler's config file for future use.

Oftentimes it seems like Modeler doesn't have as many new features as Layout does in upgrades. You usually don't see a lot of new buttons like you do in Layout. It should be noted however, that Modeler usually has some significant "under the hood" type changes. For instance, version 5.0 of Modeler has these, maybe-not-so-apparent changes:

- Solid Display is sped up about 10 times.
- Modeler's idle performance has been improved. It should now be reasonable to render in the BG while modeling in the foreground.
- BG image display is sped up about 10 to 15 times.

In addition to the above changes, Modeler now sports some new features of existing commands such as random jitter added to Rectangular Arrays and randomization of the Bevel function. New keyboard shortcuts for some features like measure, magnify and the new lasso-style zoom plus a whole slew of new plug-ins rounds out 5.0 Modeler.

Layout

Once again, Layout has gone through some significant new feature enhancement. Let's just take a walk through the panels to find out more...In the Scene panel, you'll notice that there are no more buttons for loading and saving scenes. They've been moved to the new File popup that takes the place of the Quit button of 4.0. This takes a little getting used to and you will constantly find yourself opening the Scene panel to load or save a scene and realize that you need to go to the file pop-up. The nice thing about the File pop-up is that you can access it at anytime from any open panel. Like Modeler, press the (w) key to bring up the stats for the scene, such as number of objects, lights, as well as available RAM.

The Show pop-up in the Scene panel now has the ability to show Front face polygons (the new default and faster that before) as well as partial and full solids for use with OpenGL.

The Objects panel now sports, as buttons, the hidden features of 4.0 (Multiple Target Single Envelope morphing and Cel Look edges). The Object Skeleton panel now has the much improved abilities of muscle flexing and joint-compensation. Gone is the bent garden hose effect commonly associated with LightWave's bones (Figure 4). Also, the bones algorithms have been greatly enhanced for better interaction for crossing influence ranges. The new bones features combined with new IK features, such as multiple goals, full time IK and goal strengths, have allowed LightWave to take a giant step forward in its character animation capabilities.

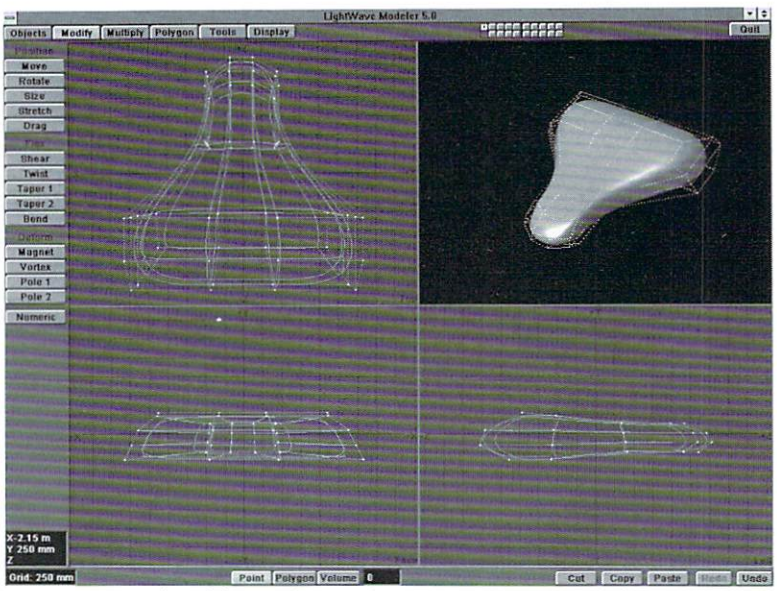

Figure 3: Pressing the Tab key toggles your object into a MetaNURBS patch object.

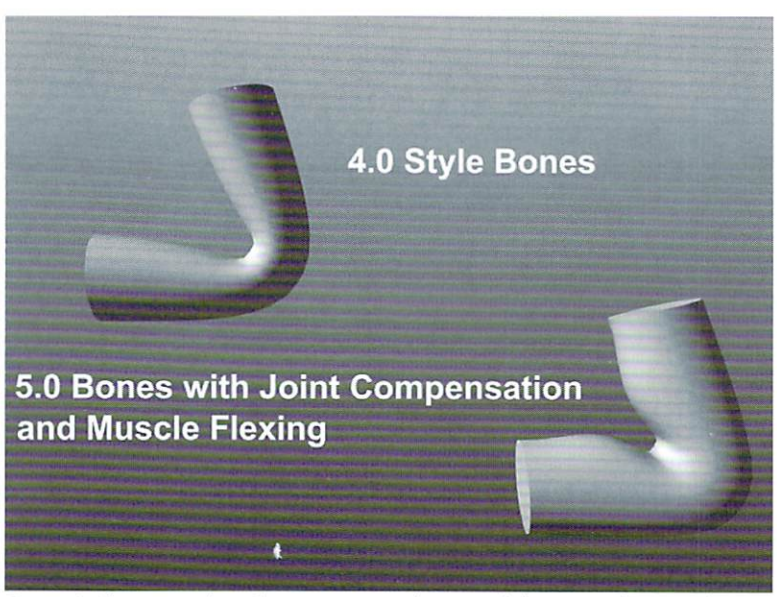

Figure 4: The same object bent using 4.0's bones and then 5.0's bones with Joint Compensation and Muscle Flexing activated.

The Surfaces panel gives us some long awaited features. You can now have multiple textures (limited by RAM) for any surface parameter. For instance, you can have three image maps, some fractal noise and a checkerboard for Surface Color. You can vary the strength of each texture by changing the Texture Opacity and you can also use alpha images for textures, so adding decals or a strip of rust to a surface is now easier than ever before. You can also have multiple textures for an objects Clip Map or Displacement Map. In addition to multiple textures, you can now copy a rendered sample's textures to your current surface by simply clicking the desired surface sample and selecting yes to the prompt that asks if you wish to copy those settings to the current surface. If the rendered sample uses any images that are not loaded anymore, they will be reloaded. Also, since the surface samples stick around after clearing a scene, you can copy surface settings across scenes.

In the Lights panel you now have the ability to tell a light not to affect either the diffuse or specular shading of surfaces. This way, you could bring up your diffuse levels without getting any hot spots in your specular (a good way to fake radiosity), or you can bring up your specular highlights without affect-

ing the overall brightness of an object. In the Lens Flare panel, you can now define the color and size of the light rings as well as define the type of star filter to be used. Also, you can now assign and image or a sequence as a projection image to a spotlight. This is a great way to cast "shadows" of trees or a stained glass look onto objects in your scene.

The Effects panel looks quite different due to the new implementation of "tabs" that help separate the panel into logical divisions help free up some real estate. The addition of new Pixel filter plug-ins rounds out this panel.

The Options panel has some new additions relating to OpenGL support. You can determine the number of lights that will affect OpenGL (up to eight) as well as set a bounding box threshold. Any object containing less points than the number entered here will not turn to bounding boxes when you are moving them around. This is incredibly handy while boning objects, so you have a real-time update to the objects being manipulated.

The Layout window itself incorporates some nice additions such as the ability to create and modify camera zoom and spotlight cone angle envelopes as well as the new Center "toggle" which keeps selected items centered at all times. Also try holding down the Control key while moving an item that has been rotated. You'll notice that when you do, you will be moving along an "items" local coordinates. This feature is sometimes called the Dolly feature because the ability to move the camera along it's local Z axis is invaluable. I just wish that it would function for rotation as well as movement.

As with any upgrade to LightWave, you should always check out the new configuration files that LightWave and Modeler write out. In doing so, you'll notice that there are some new changes in there as well. For instance, in Layout, you can now determine the brightness of the interface as well as set the default number of objects, surfaces, images and lights. You can set them anywhere from 200 to 32,000.

Plug-ins

The number of plug-ins included with LightWave 5.0 has been greatly increased. Among them are Allen Hastings' much-hyped Cel Shade shader plug-in, which when used in conjunction with Cel look edges (a hidden feature in 4.0, but an Objects panel button in 5.0) will create a 2D look to a 3D object. Also included is Fori Oruwora's Metamate plug-in which can be used to replace a low-res stand-in object with a Metaformed final object on a frame by frame basis. This allows the animator to use bones, for instance to animate a blocky object and have the same deformations happen to the final, full-res model.

Digital Muse animators Ken Stranahan and Don Waller recently used Metamation on a Sliders episode to effectively animate an allosaurus (which also used 5.0's new bones features to facilitate movement). In order for metamation to function properly, you will need to use Fori's new metaform plug-in on your objects in Modeler. This allows you to metaform objects containing more than four sides as well. Some of the other Layout plug-ins include ones that allow you to parent just about anything to anything else and some new filter plug-ins.

In Modeler, there are a lot of new, very functional plug-ins including one to reduce your polygon count by merging adjacent polygons falling within user defined angles. Also included are plug-ins to rotate objects around surface normals and arbitrary axes. Finally, there is a Metaballs plug-in by Fori for designing objects based upon Metaball objects.

Pricing

Along with the new version of LightWave comes a new pricing structure. LightWave 3D 5.0's suggested list price is $1,495.00 for Amiga, Intel, Alpha, and MIPS. SGI pricing remains to be determined. Upgrades for Amiga, Intel, Alpha and MIPS users are $495.00 (again, SGI to be determined). Existing Toaster owners can upgrade to 5.0 LightWave for only $295.00. While these prices may seem steep for Amiga users, they are definitely a bargain for the others. As of this writing, Intel and Alpha versions of 5.0 are shipping with Amiga, MIPS and SGI not far behind.

If you are an Alpha or PC owner with 4.0, I would strongly suggest upgrading to 5.0. The OpenGL support is worth the upgrade price, because it is so much easier to model and animate when you have better feedback of the look and feel of your objects.

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LWP

John Gross is co-owner of Digital Muse, a LightWave based effects facility in Hollywood.

Paintless Worlds

continued from page 9

Diffuse Level=80%

•Turn Sharp Terminator (Surfaces panel) on.
•Click Smoothing (Surfaces panel).
•Click the T (Texture Map) button beside Diffuse Level.
•Select Fractal Noise as our Current Surface and enter the following:

Texture Value=100%
Frequencies=9

•Click the T (Texture Map) button beside Transparency, select Fractal Noise as our Texture Type and enter these values:

Texture Size
X=6
Y=3
Z=6

Texture Value=300%
Frequencies=15
Contrast=1.5

The Atmosphere

•Choose Atmosphere as the Current Surface (Surfaces panel) and enter the following:

Surface Color
Red=173
Green=233
Blue=255
Diffuse Level=40%
Transparency=400%
Edge Transparency=Opaque

•Turn Sharp Terminator on (Surfaces panel).
•Click Smoothing (Surfaces panel).

A New World To Explore

Now all that's left for you to do is to position your main light, then add some stars if you wish. Make sure you take a moment to save each object with their current settings, then save the scene. When you have everything set up as you wish, take a moment to render a sample image. I hope you'll find the result convincing. The great thing about designing a planet this way is, by simply moving the coordinates of the textures, you can change the shape of the land, polar caps, or clouds. For further control of their shapes, adjust the values, frequencies and contrasts. However you experiment with this technique, just remember to have fun.

LWP

Greg Wilson is the owner of Daybawk Productions in Sioux City, Iowa. Feel free to contact him by sending a letter to P.O. Box 264, Anthon, Iowa, 51004. If you've done something with or improved upon his technique, he would love to hear from you and see an image of what you've done.

Shadow Alpha

continued from page 11

that no part of the stand-in object is visible. However, the reflections of the spray bottle are visible on the surfaces of the wall and tub. In Figure 7, the shadows cast by the bottle appear as white (actually gray) alpha values. To understand why

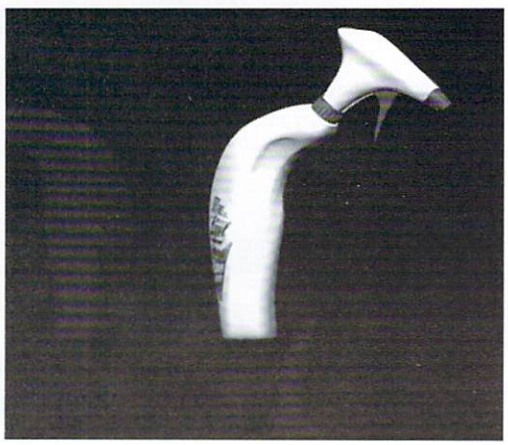

Figure 6

these gray areas in the alpha channel create shadows in the final image, consider the math behind LightWave's compositing: PixNew = [PixFG] + [PixBG * (1 - alpha)]. From this we see that as the alpha for a pixel increases, the value that is multiplied to the background pixel decreases. Hence shadows are created by any value greater than zero in alpha, so long as they aren't obscured by the foreground. To see this with our example scene, open up another LightWave window. Then load the saved RGB image as the Foreground, the alpha image as the FG Alpha, and the captured image as the Background.

The final rendered output places the CGI spray bottle next to the real world tub with shadows and reflections on all the surrounding surfaces. When done properly, it will truly look real. Figure 8 (Color pages) is the final composite. The beauty of this method is getting tremendous results with an almost trivial effort. Shadow Alpha presents several advantages, the first and most obvious being the fact that it removes all of the complexity of illuminating the stand-in object. Whether through trial and error or lighting calculations, lighting the stand-in can be difficult and/or cumbersome. Shadow Alpha makes either approach unnecessary. Using something other than pure white light is frequently desirable for lighting the foreground object. Without Shadow Alpha, this would mean discoloring the projection map on the stand-in object. But the most valuable advantage of Shadow Alpha is the ability to easily work with stand-in objects that contain curved or irregular surfaces, like our tub in the example above.

So if Shadow Alpha makes it so easy to get great results, why not forget about traditional LightWave compositing methods? There are a couple reasons. Shadow Alpha requires you to do your compositing in two passes, making it more difficult to see the final result. When I work with Shadow Alpha, I keep two LightWave windows active. In the second window, I load image sequences that reference the RGB and alpha images saved in the first window, and have them loaded into Effects/Compositing panel. This way, every time I run a test render from the first LightWave window, I don't have to reload the new images in the second window. The fact that they are loaded as image sequences already takes care of that. You just have to make sure that you test render the same frame number in the second window as you did in the first. Earlier I mentioned the compositing exercise covered in the *in.focus* tutorial tape. In this case, the stand-in object was a single planar polygon, so figuring out the proper illumination was simple and more efficient than two pass rendering. The other downside of Shadow Alpha is that the color of the shadow created is fixed, the user cannot influence it. It will always be just a darker shade of the existing background plate. However for most applications, you probably won't care.

That's about it for Shadow Alpha. Its addition to version 4.0 of LightWave has made effective compositing simple for even a novice. But the new full color background feature in version 5.0 makes it even easier.

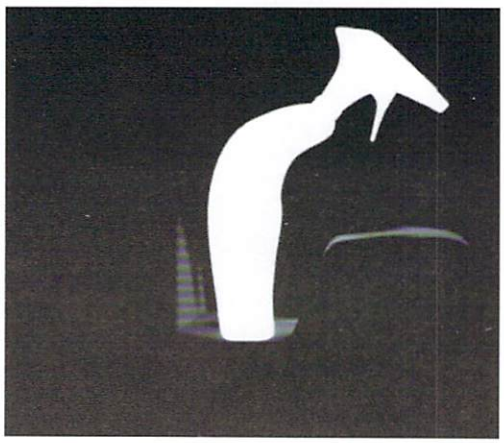

Figure 7

LWP

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Editor's Message

continued from page 3

OK, why does it really matter anyway? Here's why: Let's take the above example of someone sending a scene file/images/objects to another location to be rendered. If you used the G:\NewTek content directory and set up your scenes, they would contain relative paths to the objects or images. Now let's say you wanted to copy everything to a Zip drive and send it out. If you simply copy the entire directory structure (i.e. Objects, Images, Scenes, etc.) to the Zip (or a directory on the Zip) and send it out, you won't have to worry about your scenes/objects being messed up because LightWave can't find the proper files. Of course, this assumes that the person on the other end doing the rendering for you understands the concept of the directory structure and sets it properly. In this case, all that would need to happen is that the Content Directory in the Options panel be set to the Zip drive (or the directory on the Zip drive containing the Objects/Images/etc. directories). At that point, the scenes would load seamlessly. Of course, this assumes that all of your images are loaded from within the content structure in the first place and not another drive/path outside of the content structure.

If your scene was set up without the use of the Content Directory and someone else tried to load it off the Zip drive, the only way it would work would be if the Zip drive happened to use the same letter as what was originally used when you set up the scene, and the likelihood of that is pretty slim.

Simple to follow, right? An added benefit of the whole content directory setup is that you can seamlessly load scene files across multiple platforms. You can set a scene file up on the Amiga, save it to an accessible drive and load it on an SGI, Alpha, Intel or MIPS machine. When you get right down to it, it's rather simplistically elegant.

Quickly, before I run out of room...NewTek has made available on-line (AOL, CompuServe, their ftp site, etc.) a flic saver plug-in for Intel and Alpha; a Flyer Clip saver for Intel and Alpha and a fix for the LightSwarm plug-in for Amiga and Intel (Alpha to follow). That's it for this month...

John Gross
Editor

Splashes and Ripples

continued from page 13

they never overlap. However, using the same technique described here, you can create overlapping ripples. Instead of using different objects, use your sea object as the base for every transformation. First apply the first ripple to that object in the position you want it to appear. Then, save each transformed keyshape, bring those shapes into Layout and morph between them. Apply another Ripple displacement map to the morphing source object in the position where the second ripple happens. If you need more ripples, you can repeat the process. Note, however, that having several copies of your sea object can consume a lot of memory.

Some Final Words

When you are done, the only step missing is to give your sea and ripples a proper water surface (see Greg Teegarden's article "Beneath the Surface," *LIGHTWAVEPRO* July 1994). If you plan on using refraction, remember LightWave cannot refract a background image. In 4.0, you should set Unseen by Rays on both your sea and rippling grids to get faster results on refractions and reflections.

Using Opaque Edges will allow you to simulate refraction much faster and it will give a good splash outline if your ripples are transparent. As shown in the many past issues of *LIGHTWAVEPRO*, simulating water is a very difficult thing for any 3D program. Depending on what effect you're trying to achieve, you may opt for one tool over another, or use a combination. Hopefully, these tricks will allow you to make better use of your ripples.

LWP

Gonzalo Garramuño is an Argentinian animator whose previous bio in LIGHTWAVEPRO explained he was looking for a job. Reach him at ggarramuno@sicoar1.sicoar.com

Everything You Wanted to Know About the Ripples Texture, But Were Afraid to Ask

by Gonzalo Garramuño

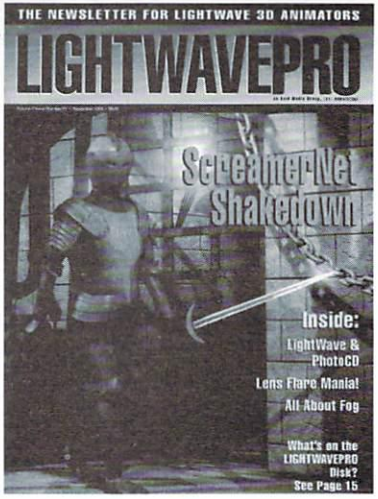
When first trying the Ripples texture in LightWave 3D, new animators are often puzzled. The Ripples texture allows you to simulate one or more concentric waves, like those generated when you throw a stone into a pond. Ripples can only be used as bump or displacement maps.

If you use several Wave Sources, you can simulate a waving sea, but using high numbers here will usually be slower than using the Fractal Bumps texture. Texture Amplitude can control the strength of the texture (how high and deep the waves are). However, it is influenced by the texture center. Note that in LightWave 4.0/5.0, this parameter has an envelope (Displacement Map only). Wavelength controls the space between each wave, and it is also influenced by the texture center. Wave Speed controls the speed at which the waves emanate from the wave sources.

Some of LightWave's common parameters to most textures (texture size, center and velocity) work in a somewhat strange way with the ripples texture. Texture Size will have an effect only if you are using more than one wave source. Multiple Wave Sources will be placed only within the volume specified by texture size, so don't use a very small texture size and an expanding sphere. If you place a flat Y plane on the same plane of the texture center, your grid will be displaced only sideways (this is more noticeable if using only one source).

In order to achieve vertical movement, place your texture center either on top or below your place object, to achieve more sea-like waves. The farther away this center is, the more influenced your plane will be by the Texture Amplitude and Wave Length, getting higher waves farther apart from each other. Ideally, you should start by setting the texture center first and then start modifying all other parameters to avoid confusion. Texture Center also specifies where the fall-off starts. Texture Velocity will allow you to move the position of the center of a single ripple or the volume for the multiple sources. It will not control the speed of waves themselves, but of their emanating points(see Wave Speed above).

Finally, Fall-Off and World Coordinates work as expected. The Ripples texture, unlike Fractal Bumps or other bump map textures, is the only one that will repeat itself in time. To calculate how long the loop is, use this simple formula: frames=wavelength/wavespeed.



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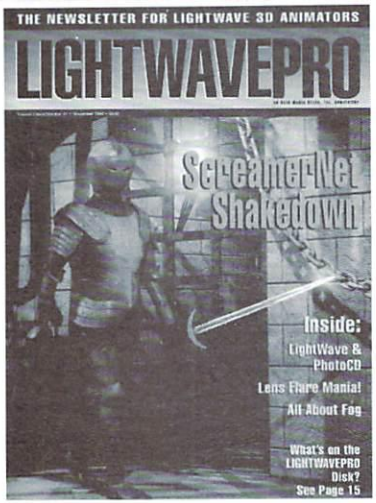

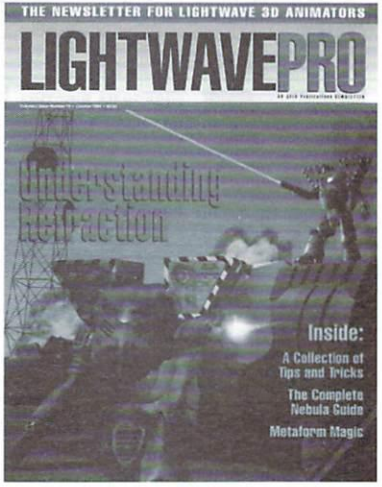

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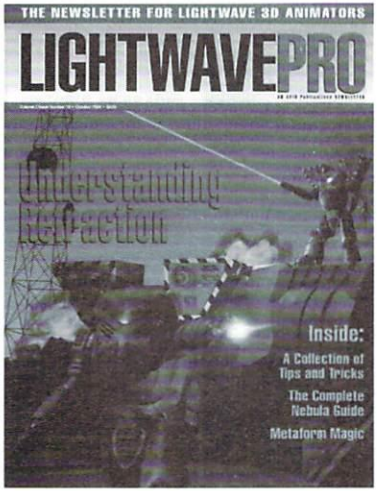

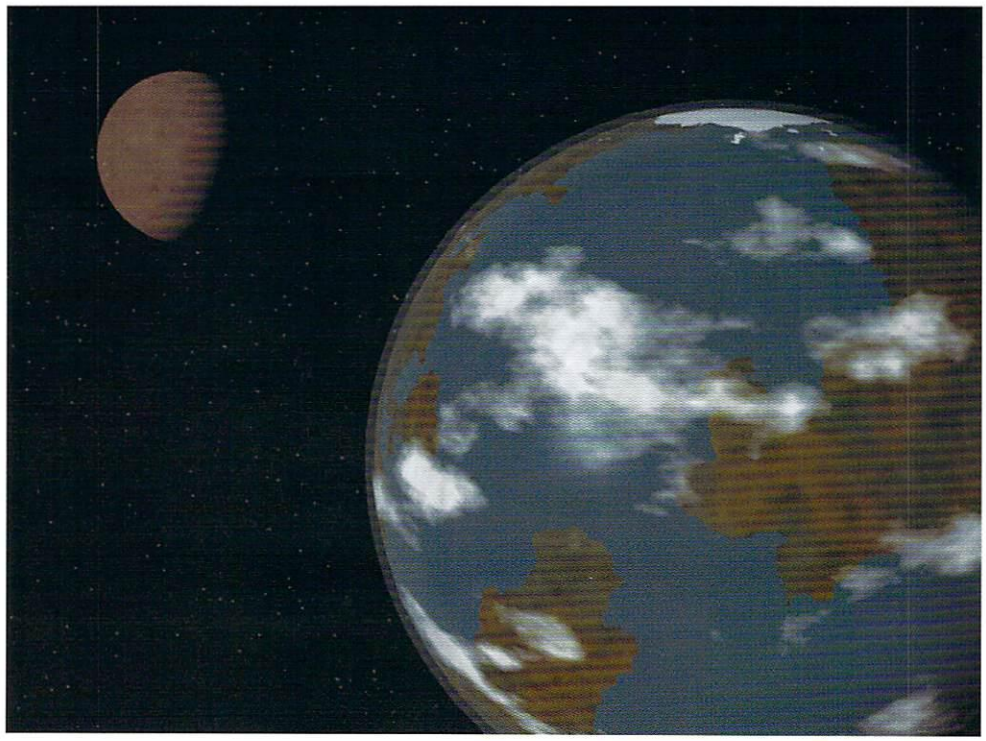

Paintless Worlds
This is the result of a world composed of nothing but fractal noise for its textures.
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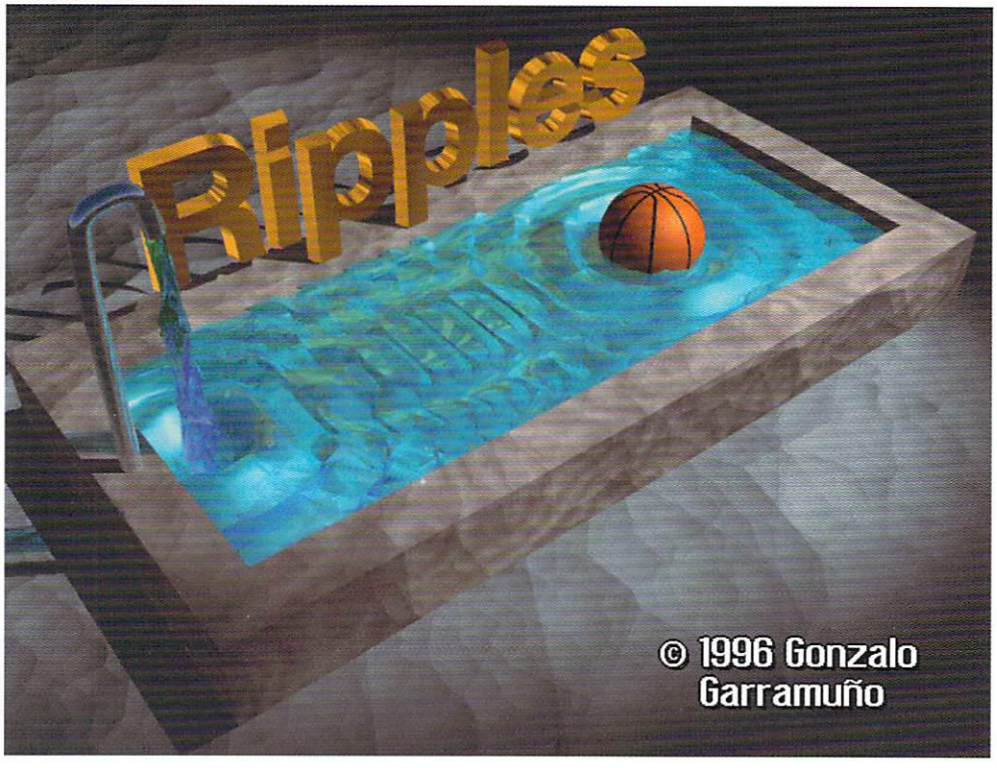

Ripples.iff
Multiple and user controlled ripples are possible using some simple tricks. (See page 12.)
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